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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,674	04/16/2001	Sven Lindfors	SEPP11.001AUS	9836
20995	7590	08/24/2005	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP			SONG, MATTHEW J	
2040 MAIN STREET			ART UNIT	
FOURTEENTH FLOOR			PAPER NUMBER	
IRVINE, CA 92614			1722	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/836,674

Applicant(s)

LINDFORS, SVEN

Examiner

Matthew J. Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-13, 16-18, 20-26 and 36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-13, 16-18, 20-26 and 36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-5, 7-13, 16-18, 21-26 and 36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 36 recite, "configured such that **all** the reactant gas entering the pre-reaction chamber is transferred to said reaction chamber" in lines 9-10 of claim 1 and lines 10-11 of claim 36. There is no support in the instant specification that all of the reactant gas is transferred to the reaction chamber. The instant specification also teaches away from this limitation because a portion of the reaction gas reacts in the pre-reaction chamber and deposits on a removable substrate; therefore not all of the reaction gas entering the pre-reaction chamber is transferred to the reaction chamber.

3. Claims 1-5, 7-13, 16-18, 21-26 and 36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1

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and 36 recite, "configured such that **all** the reactant gas entering the pre-reaction chamber is transferred to said reaction chamber" in lines 9-10 of claim 1 and lines 10-11 of claim 36. The instant specification teaches away from this limitation because a portion of the reaction gas reacts in the pre-reaction chamber and deposits on a removable substrate; therefore not all of the reaction gas entering the pre-reaction chamber is transferred to the reaction chamber. The claim is not enabled because transfer of all of the gas is not possible since at least a portion of the reaction gases will react in the pre-reaction chamber and deposit on a substrate in the pre-reaction chamber.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-5, 7-13, 16-18, 21-26 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 and 36 recite, "configured such that **all** the reactant gas entering the pre-reaction chamber is transferred to said reaction chamber" in lines 9-10 of claim 1 and lines 10-11 of claim 36. It is unclear how all of the gas entering the pre-reaction chamber is transferred to the reaction chamber when a reaction product is deposited in the pre-reaction chamber.

Claim Rejections - 35 USC § 103

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6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suntola et al (US 6,015,590) in view of Lan et al (US 4,780,174) or Lofgren et al (US 6,093,253).

Suntola et al discloses an apparatus for ALE comprising four reaction chambers 13 having substrates 12 onto which thin films are grown using the ALE process, where vapor phase reactants are fed into a reaction space in the form of vapor phase pulses repeatedly and alternately and evacuating the reaction space between successive pulses (claim 1 and col 3, ln 1-67). Suntola et al also discloses a reactant inflow channel 7 for metallic reactants such as TiCl_4 , ZnCl_2 , hydrogen sulfide and sulfur (col 4, ln 45-60, col 8, ln 30-67 and Fig 1). Suntola et al also teaches starting materials are isolated from each other thus preventing their pre-mature mutual reactions and such reactions occur in the gas phases resulting in a CVD thin film (col 7, ln 5-67). Suntola et al also teaches a design target of less than 1% of residual components of a preceding vapor phase reactant pulse remaining at the infeed of the next pulse and the reaction space can be purged to less than 1 ppm of reactant residues from the preceding pulse (col 5, ln 10-35 and col 3, ln 25-40). Suntola et al also discloses the "reaction space" includes the space in which the substrate is located and the gas inflow channels communicating with the reaction chamber (col 4, ln 25-50). Suntola et al also discloses a substrate is placed in a reaction space (Abstract and Claim 1)

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Suntola et al discloses feeding a vapor phase pulse, purging the reactor to less than 1% of residual components and feeding in a second vapor phase pulse, as applicant. Suntola et al is silent to a reaction product is formed. This is inherent to Suntola et al because Suntola et al teaches a similar residual amount of first reactant, as applicant (note instant claim 22), and similar reactants, as applicant (note pg 7 of the instant specification); therefore a reaction product is inherently formed.

Suntola et al does not teach a removable media is a separate element from the walls of the reaction chamber.

In a method of forming epitaxial films, note entire reference, Lofgren et al teaches a holding means comprises a plate on which at least two substrates are arranged in series along a gas mixture flow path and such an arrangement is series in the direction of the gas mixture flow will increase growth rate in the sense that more objects may be grown at the same time (col 2, ln 45-65). The first of the two substrates in series would read on applicant's removable medium positioned upstream of the second substrate and downstream of a point where both the first and second vapor phase reactants have entered the reaction chamber.

It would have been obvious to a person of ordinary skill at the time of the invention to modify Suntola et al by arranging at least two substrates in series in a reaction chamber to increase growth rate, as taught by Lofgren. It is also noted that Suntola et al suggests the modification because Suntola et al teaches each reaction chamber can be used for processing at least two substrates, which suggests more than two can be processed and an arrangement in series would have been obvious to a person of ordinary skill in the art.

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In a method of forming epitaxial films, note entire reference, Lan et al discloses a series of substrates located on a susceptor and epitaxial deposition is performed on the substrates (col 3, ln 1-67 and Fig 1). The first substrate of series substrates would read on applicant's removable medium positioned upstream of the second substrate and downstream of a point where both the first and second vapor phase reactants have entered the reaction chamber, note Fig 1.

It would have been obvious to a person of ordinary skill at the time of the invention to modify Suntola et al by arranging at least two substrates in series in a reaction chamber to increase growth rate in the sense that more objects can be grown at the same time, as taught by Lan et al. It is also noted that Suntola et al suggests the modification because Suntola et al teaches each reaction chamber can be used for processing at least two substrates, which suggests more than two can be processed and an arrangement in series would have been obvious to a person of ordinary skill in the art.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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9. Claims 1-5, 7-13, 16-18, 20-26 and 36 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of U.S. Patent No. US 6,506,352 in view of Suntola et al (US 6,015,590).

US 6,506,352 ('352) claims a method of depleting excess reactant from an exhaust in a ALD process, where a first reactant is reactant is reacted in a primary reaction space and then further reacting the reactant with a material downstream of the primary reaction space (claim 1). '352 also claims alternately and sequentially pulsing at least a first reactant and a different second reactant (claim 5). The primary reaction space with at least one substrate reads on applicant's removable medium upstream of a substrate, the material near the exhaust, and downstream from appoint where both the first and second vapor phase reactants have entered the reaction chamber.

'352 does not claim the second vapor phase reactant reacts with a residual first vapor phase reactant to form a solid reaction product in the reaction chamber.

Suntola et al discloses an apparatus for ALE comprising four reaction chambers 13 having substrates 12 onto which thin films are grown using the ALE process, where vapor phase reactants are feed into a reaction space in the form of vapor phase pulses repeatedly and alternately and evacuating the reaction space between successive pulses (claim 1 and col 3, ln 1-67). Suntola et al also discloses a reactant inflow channel 7 for metallic reactants such as TiCl_4 , ZnCl_2 , hydrogen sulfide and sulfur (col 4, ln 45-60, col 8, ln 30-67 and Fig 1). Suntola et al also teaches starting materials are isolated from each other thus preventing their pre-mature mutual reactions and such reactions occur in the gas phases resulting in a CVD thin film (col 7, ln 5-67). Suntola et al also teaches a design target of less than 1% of residual components of a preceding

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vapor phase reactant pulse remaining at the infeed of the next pulse and the reaction space can be purged to less than 1 ppm of reactant residues from the preceding pulse (col 5, ln 10-35 and col 3, ln 25-40). Suntola et al also discloses the "reaction space" includes the space in which the substrate is located and the gas inflow channels communicating with the reaction chamber (col 4, ln 25-50). Suntola et al also discloses a substrate is place in a reaction space (Abstract and Claim 1)

Suntola et al discloses feeding a vapor phase pulse, purging the reactor to less than 1% of residual components and feeding in a second vapor phase pulse, as applicant. Suntola et al is silent to a reaction product is formed. This is inherent to Suntola et al because Suntola et al teaches a similar residual amount of first reactant, as applicant (note instant claim 22), and similar reactants, as applicant (note pg 7 of the instant specification); therefore a reaction product is inherently formed.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify '352 by purging to 1ppm, as taught by Suntola, to minimize gas phase reactions.

The combination of '352 and Suntola teach gas phase reaction will inherently occur because a residual portion of gases will remain between successive pulses.

Conclusion

10. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song

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Examiner

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MJS

August 18, 2005

DUANE SMITH
PRIMARY EXAMINER

D - A
8-19-05